

Missouri Department of Natural Resources

## Total Maximum Daily Load Information Sheet

### Warm Fork Spring River

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#### Water Body Segment at a Glance:

**County:** Oregon  
**Nearby Cities:** Thayer  
**Length of impaired segment:** 12 miles  
**Length of impairment within segment:** 1.2 miles  
**Pollutant:** Bacteria  
**Source:** Unknown  
**Water Body ID:** 2579



State Map Showing Location of Watershed

**Scheduled for TMDL development:** 2013

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#### Description of the Problem

##### Designated beneficial uses of Warm Fork Spring River

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health (Fish Consumption)
- Whole Body Contact Recreation – Category A
- Secondary Contact Recreation
- Irrigation

##### Use that is impaired

- Whole Body Contact Recreation – Category A

##### Standards that apply

- Missouri's Water Quality Standards at 10 CSR 20-7.031(4)(C) state that the *E.coli* bacteria count shall not exceed 126 colonies per 100 milliliters of water (126 col/100 mL) for Category A and 206 col/100 mL for Category B. This count is the geometric mean during the recreational season (April 1- October 31) in waters designated for whole body contact recreation. The fecal coliform criteria of 200 col/100 mL can be used for Cat. A waters in the absence of *E.coli* data.

##### Background information and Water Quality Data

Warm Fork Spring River is a rural stream that flows south into Arkansas. It goes through the town of Thayer. It is designated as Category A for the whole body contact recreation use, which means it has swimming areas which are open to and fully accessible by the public.

Excessive amounts of fecal bacteria in surface water used for recreation are an indication of an increased risk of pathogen-induced illness to humans. Infections due to pathogen-contaminated waters include gastrointestinal, respiratory, eye, ear, nose, throat and skin diseases. Both *E. coli* and fecal coliform are bacteria found in the intestines of warm blooded animals and are used as indicators of the risk of waterborne disease from pathogenic (disease causing) bacteria or viruses. Most strains of these bacteria are harmless, but some can cause serious illness in humans and are occasionally responsible for product recalls. The harmless strains are part of the normal flora of the intestines, and can benefit their hosts by preventing the establishment of pathogenic bacteria within the intestine<sup>1,2</sup>. Missouri's bacteria criteria are based on specific levels of risk of acute gastrointestinal illness. The levels of risk correlating to these criteria are no more than eight illnesses per 1,000 swimmers in fresh water.

Evidence for bacteria impairment in Warm Fork Spring River is based on fecal coliform, rather than *E. coli*, data collected the Arkansas Department of Environmental Quality in 1999. Six spring and summer samples were taken that year near Thayer. The listing methodology states that, to be considered not impaired, a water body must meet the water quality criterion in each of the last three years of available data and that the geometric mean must consist of at least five data points within the recreational season. The geometric mean for the 1999 recreational season was 346 col/100 mL. This exceeds the 200 colonies/100ml fecal coliform criteria (see "Standards that apply" above). 1999 data are considered old data; however, there are no more recent data to assess whether the river is still violating the bacteria criterion or not. Therefore, Warm Fork Spring River remains on the 303(d) List.

People can protect themselves from waterborne illness by avoiding contact with contaminated water. However, when swimming anywhere, it is wise to take common sense precautions. These include washing hands before eating, showering after swimming and avoiding exposure to questionable water if you have open cuts or wounds.

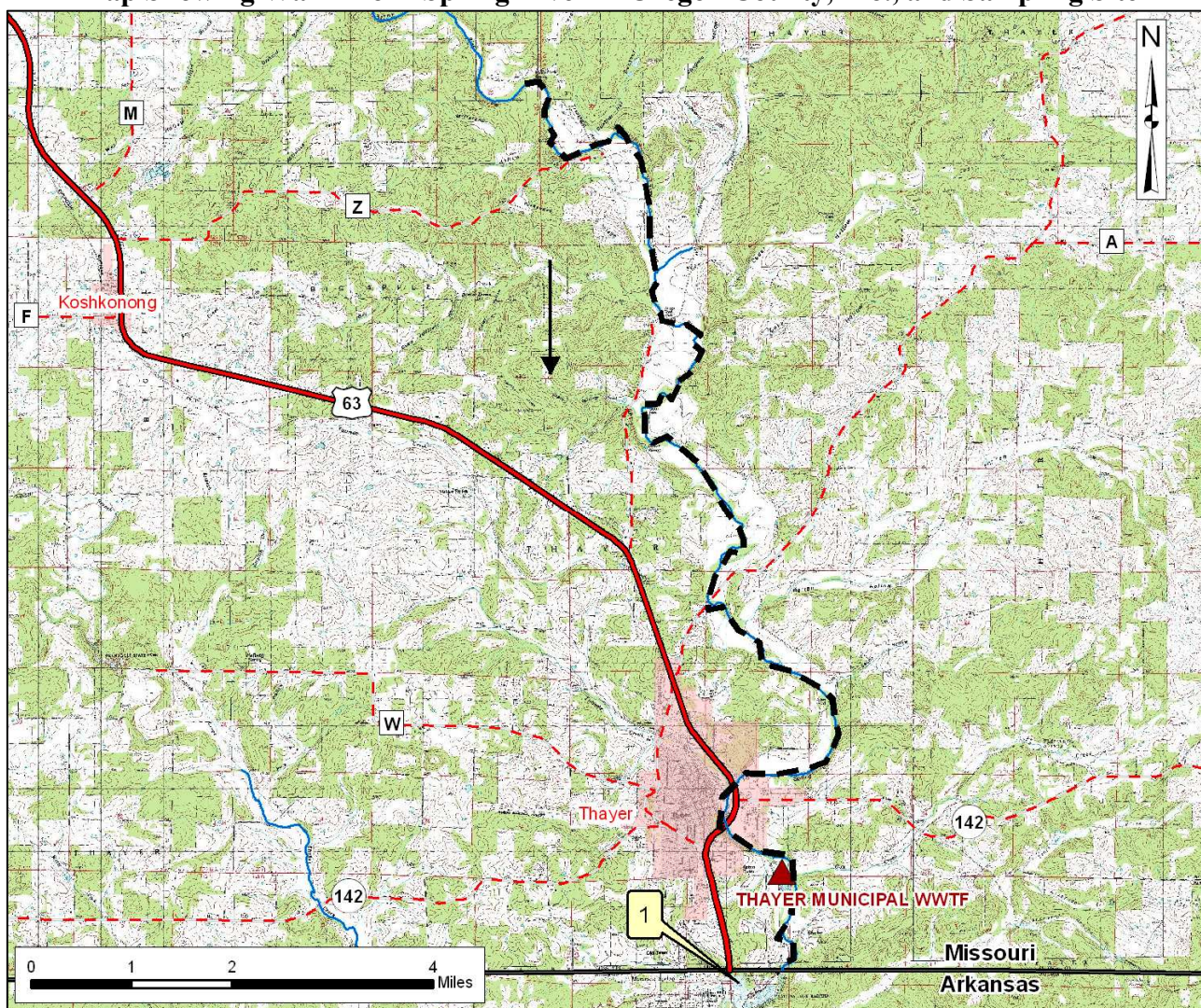
**Fecal Coliform Data for Warm Fork Spring River**

Year	Mo	Day	Fecal Coliform (col/100 mL)
1999	4	6	9800
1999	5	11	116
1999	6	15	450
1999	7	20	80
1999	8	24	320
1999	9	21	132
Geometric mean			346

<sup>1</sup> Hudault S, Guignot J, Servin AL (July 2001). "*Escherichia coli* strains colonising the gastrointestinal tract protect germfree mice against *Salmonella typhimurium* infection". *Gut* **49** (1): 47–55

<sup>2</sup> Reid G, Howard J, Gan BS (September 2001). "Can bacterial interference prevent infection?". *Trends Microbiol.* **9** (9): 424–8.

**Map Showing Warm Fork Spring River in Oregon County, Mo., and Sampling Site**



— — — Impaired Segment

—————> Direction of flow

**Sample Site**

1 – Mammoth Spring in Mammoth Springs, Ark.

**For more information call or write:**

Missouri Department of Natural Resources

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